UNITED STATES PATENT AND TRADEMARK OFFICE

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte J.G. WALACAVAGE and JIM D. COBURN

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Appeal 2009-008741
Application 09/966,121
Technology Center 2100

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Before HOWARD B. BLANKENSHIP, JAY P. LUCAS, and THU A. DANG, *Administrative Patent Judges.*

DANG, *Administrative Patent Judge.*

DECISION ON APPEAL

I. STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134(a) from a Final Rejection of claims 1-19. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

A. INVENTION

According to the Appellants, the invention relates to emulating machine tool behavior for a programmable logic controller logical verification system for manufacturing a motor vehicle (Spec. 1, ll. 14-18).

B. ILLUSTRATIVE CLAIM

Claim 1 is exemplary:

1.   A method of using transformational arrays to emulate model behavior for a programmable logic controller logical verification system, said method comprising the steps of:

constructing a mechanical model using a computer;

generating transformational arrays for the mechanical model by incrementally recording one position of each piece of geometry of the mechanical model moved through space over a period of time using the computer;

viewing motion of the mechanical model in a motion viewer based on the transformational arrays using the computer;

determining whether the motion of the mechanical model is acceptable;

replicating the motion of the mechanical model by generating a PLC code for the motion of the mechanical model using the computer if the motion of the mechanical model was acceptable; and

using the accepted motion of the mechanical model to compare the behavior of the PLC code relative to the accepted motion by playing the PLC code with a PLC emulator.

C. REJECTION

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Walacavage   US 6,442,441 B1   Aug. 27, 2002
                                            (filed on May 17, 1999)

Claims 1-19 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Walacavage.

II. ISSUE

The dispositive issue is whether the Examiner has erred in determining that Walacavage teaches "generating transformational arrays for the mechanical model by incrementally recording one position of each piece of geometry of the mechanical model moved through space over a period of time," "viewing motion of the mechanical model in a motion viewer based on the transformational arrays" and "replicating the motion of the mechanical model" (claim 1). In particular, the issue turns on whether Walacavage's neutral control model file comprises the "transformational arrays" as required by claim 1.

III. FINDINGS OF FACT

The following Findings of Fact (FF) are shown by a preponderance of the evidence.

Appellants' Invention

1. Appellants define "transformational arrays" as "movies of manipulation of individual components in the mechanical model" (Spec. 9, ll. 11-17).

Walacavage

2. Walacavage discloses a method of automatically generating and verifying programmable logic controller (PLC) code which comprises constructing a neutral control model file, determining whether the neutral control model file is correct, and generating PLC code if the neutral control model file is correct (col. 1, ll. 48-51).

3. A neutral control model file is a neutral file that contains a definition of a "control model" that represents the critical elements required to control manufacturing tooling not specific to any one PLC hardware platform, manufacturing tooling design, or processing planning system (col. 2, ll. 54-62).

4. The neutral control model file contains a description of interlocked events which define the required dependencies, actions and signals that are associated with sentencing and cycling manufacturing tooling devices (col. 2, ll. 63-67), wherein the control model would have individual events that describe when the conditions were correct for a clamp to open or close (col. 3, ll. 1-3).

5. If a fixture station has robots or flexible automation involved, the workcell design system will import the fixture and processing data

defined in the neutral control model file from the fixture design system, allowing the user to add robots to interact with the fixture and clamps (col. 3, ll. 28-34).

IV. ANALYSIS

The Examiner finds that Walacavage teaches transformational arrays because "the fixture design system will create a neutral control model definition that describes how four clamps need to be sequenced along with a hard tooled welder ... control model is information that describes events, dependencies, and logical conditions that are used to drive line modeling" (Ans. 3). According to the Examiner, "in order to have a condition or action of opening and closing of a clamp in the neutral control model file (i.e. transformational array), there must be an incremental recording of the mechanical model moved through space over a period of time (i.e. inherent to clamp to open or close" (Ans. 11). Further, according to the Examiner, Walacavage teaches viewing motion of the mechanical model because Walacavage "plays a line model by the line verification system wherein the line verification system is a viewing tool, which is driven by the control model" (Ans. 3).

However, Appellants contend that "transformational arrays are movies of manipulation of individual components in the mechanical model" and thus "the neutral control model file [of Walacavage] is not the same thing as a mechanical model with the transformational arrays of the present [invention]" (App. Br 14). Further, Appellants argue that Walacavage also does not disclose a motion viewer "to play the PLC code such that the user can observe the motion of the mechanical model using the actual PLC code

as if they were watching a machine or manufacturing line of a vehicle assembly plant floor" (*id.*). Thus, Appellants also contend that Walacavage "does not perform the steps of replicating a motion of a mechanical model" (App. Br. 15).

Upon review of the records, we agree with Appellants. Though we will not read limitations from the Specification into the claims, we nevertheless give the claim its broadest reasonable interpretation *consistent* with the Specification. *See In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997) and *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993). As defined by Appellants in the Specification, "transformational arrays" are "movies of manipulation of individual components in the mechanical model" (FF 1). We do not find any teaching of "transformational arrays" in the portions of Walacavage relied upon by the Examiner. In particular, we do not find any teachings of generating transformational arrays, wherein *motion* of the mechanical model is *viewed based on the transformational arrays*, in the sections of Walacavage cited by the Examiner, as required by claim 1.

Walacavage discloses constructing a neutral control model file to generate PLC code (FF 2), wherein the neutral file contains *a definition* of a "control model" not specific to any one PLC hardware platform, manufacturing tooling design, or processing planning system (FF 3). In particular, the neutral control model file contains *a description* of interlocked events which *define* the required dependencies, actions and signals that are associated with sentencing and cycling manufacturing tooling devices, wherein the control model would have individual events that *describe* when *the conditions* were correct for a clamp to open or close (FF

4). For example, fixture and processing *data defined* in the neutral control model file are imported from the fixture design system, allowing the user to add robots to interact with the fixture and clamps (FF 5).

We find the neutral control model file as described in these portions cited by the Examiner of Walacavage to merely comprise a description of events and data defining a control model that is not specific to any platform or design, wherein the data defined by the file is imported from the design system. That is, these portions of Walacavage do not disclose by any teaching of movies of manipulation of individual components in a mechanical model. Thus, though the Examiner finds that "in order to have a condition or action of opening and closing of a clamp in the neutral control model file …, there must be an incremental recording of the mechanical model moved through space over a period of time (i.e. inherent to clamp to open or close)" (Ans. 11), there is no action of opening or closing of a clamp in the neutral control model file since the file merely contains data defining/describing the action. In fact, since the control model file is a "neutral" file not specific to any platform, design, or system (FF 3), there cannot be any incremental recording of any particular mechanical model in the neutral file but rather the neutral file is to be imported from the design system.

Further, though the Examiner finds that Walacavage "plays a line model by the line verification system" (Ans. 3), we cannot find any teachings in the portions of Walacavage cited by the Examiner of *viewing motion* based on the transformational array, as required by claim 1. In fact, we do not find any teaching of motion to be viewed in the portions of Walacavage relied upon by the Examiner.

Accordingly, we find that Appellants have shown that the Examiner erred in rejecting representative claim 1, claim 11 falling therewith, and claims 2-10 and 11-19 depending respectively therefrom over Walacavage.

V. CONCLUSION AND DECISION

The Examiner's rejection of claims 1-19 under 35 U.S.C. § 102(e) is reversed.

REVERSED

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